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NTE2382 MOSFET N-Channel Enhancement Mode, High Speed Switch (Compl to NTE2383)

Description:

The NTE2382 is a MOS power N-Channel FET in a TO220 type package designed for high voltage, high speed power switching applications such as switching regulators, converters, solenoid, and relay drivers.

Features:

- Lower $R_{DS(ON)}$
- Improved Inductive Ruggedness
- Fast Switching Times
- Rugged Polysilicon Gate Cell Structure
- Lower Input Capacitance
- Extended Safe Operating Area
- Improved High Temperature Reliability

Absolute Maximim Ratings:

Drain-Source Voltage (Note 1), V_{DSS}	100V
Drain-Gate Voltage ($R_{GS} = 1M\Omega$, Note 1), V_{DGR}	100V
Gate-Source Voltage, V_{GS}	$\pm 20V$
Continuous Drain Current, I_D	
$T_C = +25^\circ C$	9.2A
$T_C = +100^\circ C$	6.5A
Drain Current, Pulsed (Note 3), I_{DM}	37A
Gate Current, Pulsed, I_{GM}	$\pm 1.5A$
Single Pulsed Avalanvhe Energy (Note 4), E_{AS}	36mJ
Avalanche Current, I_{AS}	9.2A
Total Power Dissipation ($T_C = +25^\circ C$), P_D	50W
Derate Above $25^\circ C$	0.4W/ $^\circ C$
Operating Junction Temperature Range, T_{opr}	-55° to $+150^\circ C$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ C$
Thermal Resistance, Junction-to-Ambient, R_{thJA}	62.5 $^\circ C/W$
Thermal Resistance, Junction-to-Case, R_{thJC}	2.5 $^\circ C/W$
Thermal Resistance, Case-to-Sink (Note 5), R_{thCS}	0.5 $^\circ C/W$
Maximum Lead Temperature (During Soldering, 1/8" from case, 5sec), T_L	$+300^\circ C$

- Note 1. $T_J = +25^\circ$ to $+150^\circ C$
 Note 2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
 Note 3. Repetitive rating: Pulse width limited by max. junction temperature.
 Note 4. $L = 64mH$, $V_{DD} = 25V$, $R_G = 25\Omega$, Starting $T_J = +25^\circ C$.
 Note 5. Mounting surface flat, smooth, and greased.

Electrical Characteristics: ($T_C = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0, I_D = 0.25\text{mA}$	100	–	–	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 100\text{V}, V_{GS} = 0$	–	–	0.25	mA
		$V_{DS} = 80\text{V}, V_{GS} = 0, T_J = +125^\circ\text{C}$	–	–	1.0	mA
Gate–Body Leakage Current, Forward	I_{GSS}	$V_{GS} = 20\text{V}$	–	–	100	nA
Gate–Body Leakage Current, Reverse	I_{GSS}	$V_{GS} = 20\text{V}$	–	–	–100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 0.25\text{mA}$	2.0	–	4.0	V
Static Drain–Source On–Resistance	$r_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 4.6\text{A}$, Note 2	–	–	0.27	Ω
Forward Transconductance	g_{FS}	$V_{DS} \geq 50\text{V}, I_D = 4.6\text{A}$, Note 2	2.7	4.1	–	mhos
Input Capacitance	C_{iss}	$V_{DS} = 25\text{V}, V_{GS} = 0, f = 1\text{MHz}$	–	400	–	pF
Output Capacitance	C_{oss}		–	130	–	pF
Reverse Transfer Capacitance	C_{rss}		–	40	–	pF
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 50\text{V}, I_D = 9.2\text{A}, Z_O = 18\Omega$, MOSFET switching times are essentially independent of operating temperature	–	8.8	13.0	ns
Rise Time	t_r		–	30	45	ns
Turn–Off Delay Time	$t_{d(off)}$		–	19	27	ns
Fall Time	t_f		–	20	30	ns
Total Gate Charge	Q_g	$V_{GS} = 10\text{V}, V_{DS} = 80\text{V}, I_D = 9.2\text{A}$, Gate charge is essentially independent of operating temperature	–	–	23	nC
Gate–Source Charge	Q_{gs}		–	4.6	–	nC
Gate–Drain (“Miller”) Charge	Q_{gd}		–	9.1	–	ns
Source–Drain Diode Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S		–	–	9.2	A
Pulse Source Current (Body Diode)	I_{SM}	Note 3	–	–	37	A
Diode Forward Voltage	V_{SD}	$T_J = +25^\circ\text{C}, I_S = 9.2\text{A}, V_{GS} = 0\text{V}$, Note 2	–	–	2.5	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}, I_F = 9.2\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	–	110	240	ns

Note 2. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

Note 3. Repetitive rating: Pulse width limited by max. junction temperature.

